G. F. Becker and A. L. Day, direct attention to the fact that in the study of ore deposits occurrences are observable in which crystals have exerted a very considerable force. Pyrites, for example, is formed in slate in such a way as to drive apart the laminæ of the rock without any perceptible deformation of the crystals occurring. A description is given of some experiments performed in order to determine the lifting force exerted by crystals of alum growing in a saturated solution whilst subjected to the pressure of a heavy weight. Under the title "An Interesting Pseudosolid," the same authors contribute an account of some investigations of the behaviour of fresh white of egg beaten into a fine foam with an equal volume of powdered sugar. Cylinders of uniform size were cut out of the mass of foam and subjected to compressive or tensile stress, the changes in the dimensions being carefully observed. A series of photographs of the entire foam cylinder after successive increments of compression was made, and then, by superposing the plates, accurate traces of the path of each component particle were obtained. The authors consider that the results obtained offer a confirmation of Prof. J. J. Thomson's theory of solids.

MR. WILHELM ENGELMANN, of Leipzig, has published a fourth, revised edition of Prof. P. Groth's "Physikalische Krystallographie und Einleitung in die krystallographische Kenntnis der wichtigsten Substanzen." The third edition of Prof. Groth's famous book was the subject of an article in our issue for January 30, 1896 (vol. liii. p. 289). Many students of crystallography will welcome the present edition.

A SECOND edition of Dr. F. Mollwo Perkin's "Qualitative Chemical Analysis, Organic and Inorganic," has been published by Messrs. Longmans, Green and Co. The first edition was reviewed in our issue for August 22, 1901 (vol. lxiv. p. 397); and all that need now be said is that more theory has been introduced, the portions dealing with the analysis of acids and the treatment of the substance to be analysed have been recast, and several additions have been made, those in organic analysis being specially intended for university and pharmaceutical students.

A SIXTH edition, revised and enlarged, of Prof. R. Wiedersheim's "Vergleichende Anatomie der Wirbeltiere" has been published by Mr. Gustav Fischer, of Jena. An English edition, founded on the third German edition, was reviewed in NATURE for September 1, 1898 (vol. lviii. p. 409). It is only necessary to state here that this standard work continues to grow in bulk; for instance, the bibliographical appendix, which in the English edition referred to runs to some ninety pages, occupies in the new edition nearly 140 pages.

MR. AKSEL G. S. JOSEPHSON, of the John Crerar Library, Chicago, has sent us a copy of a pamphlet in which he puts forward a proposition for the establishment of a bibliographical institute. Mr. Josephson maintains that as there are laboratories for chemical, physical, and hygienic research, there should also be an institute for conducting bibliographical research, where records of literary productions would be made systematically, and to which persons desiring information of a bibliographical character could turn with their inquiries. Such an institute, he remarks, organised as a bureau of scientific information, would be a boon to all investigators. The institute should be established on an international basis, and its function should be to record, classify, and evaluate printed literature. It should be part of the regular duty of the staff of the institute to index the society publications which are not included in existing indexes to periodical literature. Bibliographies of special subjects should be prepared to fill existing gaps. To establish such an institute on a reasonably permanent basis would, Mr. Josephson estimates, require an endowment of at least 200,000*l.*

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN DECEMBER:—

Dec.	2.	5h. Saturn in conjunction with Moon (Saturn 1° 21′ S.).
,,	3.	10h. 49m. Minimum of Algol (β Persei).
,,	6.	7h. 38m. Minimum of Algol (β Persei).
,,	8.	5h. 35m. to 6h. 43m. Moon occults μ Ceti (mag. 4·4).
,,	9.	4h. 49m. to 5h. 43m. Moon occults *f* Tauri (mag. 4·3).
,,	9.	5h. 48m. to 7h. 21m. Transit of Jupiter's Sat. III. (Ganymede).
,,	10.	4h. 58m. to 5h. 56m. Moon occults γ Tauri (mag. 3·9).
,,	10.	14h. 52m. to 15h. 53m. Moon occults α Tauri (mag. 1·1).
,,	10.	Saturn. Major axis outer ring = 38″·34. Minor axis = 7″·31.
,,	10–12.	Epoch of December meteors (Geminids, Radiant 108° + 33°).
,,	15.	Venus. Illuminated portion of disc = 0·970. Of Mars = 0·900.
,,	16.	9h. 5m. to 10h. 41m. Transit of Jupiter's Sat. III. (Ganymede).
,,	19.	19h. 53m. to 21h. 2m. Moon occults γ Virginis (mag. 3·0).
,,	22.	0h. Sun enters Virgo. Winter commences.
,,	23.	12h. 26m. to 14h. 6m. Transit of Jupiter's Sat. III. (Ganymede).
,,	25.	16h. Mars and Saturn in conjunction (Mars 0° 30′ N.).
,,	26.	7h. Uranus in conjunction with the Sun.
,,	26.	9h. 21m. Minimum of Algol (β Persei).
,,	29.	6h. 10m. Minimum of Algol (β Persei).
,,	30.	20h. Neptune in opposition to the Sun.

COMET 1905*b*.—The observation of comet 1905*b* at Bamberg on November 18 was made by Prof. Hartwig, who, in addition to determining the position given in these columns last week, recorded that the magnitude of the comet was 7·5, that the object was round with a diameter of 10′, and that the central nucleus had a magnitude of 11·0.

An observation made by Prof. Aitken at the Lick Observatory on November 18 gave the comet's position, at 8h. 17m. 31s. (Mount Hamilton M.T.), as

R.A. (app.) = 0h. 33m. 54·4s., dec. = +77° 17′ 26″.

The appearance and the rapid apparent movement of this object seem to point to its comparative proximity to the earth (*Astronomische Nachrichten*, No. 4055).

The following elements and ephemeris, which have been computed by Herr M. Ebell from the observations of November 18, 19, and 20, are given in Circular No. 80 of the Kiel Centralstelle:—

Elements.

T = 1905 October 27·4926 (Berlin M.T.).

$$\left.\begin{aligned} \varpi &= 135^\circ\ 38'{\cdot}7 \\ ☊ &= 223\ \ 45{\cdot}4 \\ i &= 138\ \ 54{\cdot}6 \end{aligned}\right\} 1905{\cdot}0$$

$\log q = 0{\cdot}02626$

Ephemeris 12h. (Berlin M.T.)

1905		α h. m. s.		δ ° ′		log Δ		Brightness
Dec. 2	...	23 30 49	...	+1 11·8	...	9·7150	...	0·20
6	...	23 30 49	...	−4 46·6	...	9·8163	...	0·12
10	...	23 31 28	...	−8 36·1	...	9·9002	...	0·08

Brightness at time of discovery = 1·0.

An observation made at Bamberg on November 21 gave corrections of −32s. in R.A. and +4′·1 in declination to the above ephemeris.

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AN UNTRIED METHOD OF DETERMINING THE REFRACTION CONSTANT.—In No. 8, vol. xiii., of *Popular Astronomy*, Mr. Geo. A. Hill, of Washington, describes a new and, as he believes, an untried method for determining the constant of refraction.

Briefly, the method consists in observing the times at which two stars, separated by about twelve hours in right ascension, and both of nearly the same declination, transit across a horizontal wire *in the prime vertical*. In each case the refraction decreases the hour angle, and the arithmetical sum of the hour angles of the two stars will differ from the difference between their right ascensions by twice the refraction, expressed in time, at the zenith distance at which they were observed.

To make this observation Mr. Hill proposes the employment of an instrument similar in form and in the rigidity of its parts to the modern zenith telescope. The telescope is to be established in the prime vertical, and mounted so that it is capable of rotation about a rigid vertical axis. Two stops fixed to the base of the instrument would ensure that when the telescope was rotated in azimuth about the vertical axis its line of collimation would still be in the prime vertical. Obviously the ideal position for the making of the observations would be at or near to the earth's equator. Many other details of the proposed plan of observations are given at length in Mr. Hill's paper.

SPECTRA OF BRIGHT SOUTHERN STARS.—An appendix to vol. xxviii. of the Annals—the volume in which appeared the "Catalogue of the Spectra of Bright Southern Stars"—has just been published by the Harvard College Observatory. It contains two tables, in the first of which there are given the particulars of sixty-nine stars which were accidentally omitted from Table I. in the original volume, and in the second the corrected classification of the spectra of thirty stars which were previously wrongly described.

A CATALOGUE OF 4280 STARS.—No. 15 of the *Publications of the Cincinnati Observatory* is devoted to a catalogue of the positions and precessional constants of 4280 of the stars given in Piazzi's catalogue.

All the stars given by Piazzi that were north of the equator in 1800, except those included in the Berlin "Jahrbuch" and eighteen of the Pleiades group, are included in the catalogue, and the Piazzi number, the position for 1900, the precession, the proper name, and the magnitude are given for each. An appendix contains the proper motions of 35 stars which were placed on the observing list, mostly taken from the Cambridge A.G. Catalogue.

HIGHER EDUCATION AT THE CAPE.

HIGHER education in Cape Colony is at the present time in a very interesting and perhaps critical condition. It is indeed characteristic of the tardiness of progress in that colony (the eternal motto is "Wacht een beetje") that the crisis should not have arrived until nearly eighty years after the foundation of the first institution designed to promote advanced studies—the South African College in Cape Town. The causes of this retardation are to be found partly in dissipation of effort, partly in the mischievous influence of an iron system of external examinations. The South African College was started on a small scale in 1829 through the liberality of a number of citizens of Cape Town, who became "shareholders" in the venture; but though after a few years it was recognised as a public institution and received support from the public treasury, it did not at first develop with much rapidity; and in 1849 Bishop Gray, after an unsuccessful attempt to buy out the majority of the "shareholders," founded the Diocesan College as a rival institution in the suburbs, thus inaugurating the unhappy policy of multiplying colleges from which the colony still suffers. Four years later Sir George Grey's administration instituted a public board of examiners with power to grant certificates in various subjects, another fateful step, for from that board there sprang in 1873 the University of the Cape of Good Hope, the only body in South Africa which has the right to confer degrees. The character of this so-called university deserves notice. It was modelled on the old University of London, the example of which it follows only too faithfully. It is managed by a council, half the members of which are appointed by Government, the other half elected by the convocation of graduates. It exercises the two functions of examining and granting degrees, but it does not teach. So abhorrent to it, indeed, is any connection with teaching that it does not allow teachers of candidates to take part in the examinations, a most deleterious prohibition, since in many subjects the only experts belong to the staffs of the colleges. Dissatisfaction with this examining university is the chief cause of the present crisis. Meantime the multiplication of colleges and the wasteful reiteration of similar work in a number of centres has gone on apace. Some of the smaller colleges have, it is true, died out; but there still remain, in addition to the two already mentioned, the Victoria College at Stellenbosch, which was incorporated in 1881, the Huguenot College for Women at Wellington (1898), and the Rhodes University College, which in 1904 took the place of St. Andrew's College at Grahamstown. The western province, therefore, has four colleges, all within forty miles of Cape Town, and the eastern province has one. They are bound hand and foot by the syllabuses and regulations of the university, for the examinations of which they prepare. Alike in strength and in character, however, they vary greatly. The South African College has in recent years developed with wonderful rapidity. It now supports seventeen chairs and has about 260 students, whom it draws in approximately equal numbers from the British and from the Dutch, and in thus bringing the two races together exercises a most beneficent influence, which it rightly regards as one of its chief claims to support. Its arts buildings are old and need reconstruction, but blocks of science buildings have lately been erected which would do credit to any unversity in the Empire, and the intention is to house the arts also on a similar scale. The only other college approaching it in strength is that of Stellenbosch, which has also developed recently, though it remains somewhat smaller and is less well equipped for the teaching of science. That the two strongest colleges should be in such close proximity is a particularly unfortunate result of the short-sighted policy (or lack of policy) which has been characteristic of the educational administration of the colony in the past. On purely educational grounds this duplication cannot be justified. But it is to be feared that racial rather than properly educational motives have led to the development of a second large college so near to Cape Town, and this may be said without any reflection upon the instruction given at it. For the Victoria College is almost completely under the influence of the neighbouring theological seminary of the Dutch Reformed Church; its students are almost entirely Dutch; it is in sentiment and in popular estimation the Dutch College. Even were the instruction provided the best in the world, it would be still altogether deplorable that this tendency to racial separatism in education should have gained recognition and support. Of the remaining colleges, that at Grahamstown has a fairly large staff, but as yet few students and no buildings, and in view of the backward state of education in the east its position seems a little precarious, but if it can encourage the schools in that part to improve it should prosper. The Diocesan College and the Huguenot College are both small, and probably they will in the end have to unite with their more powerful neighbours.

The education provided by the colleges is not so good as it might be under more favourable conditions. One at least of them, the South African College, is in every way competent to give as advanced instruction as most colonial universities, and equally with them to promote research; but it is hampered at once by the schools below it and by the university above it. In mathematics, indeed, the general standard of the schools is remarkably high; a few schools maintain a fair standard in science as well, but in literary subjects they are all miserably weak. This is partly due to the absence of any proper system of secondary or of intermediate education. The Education Department is frequently accused of an undue affection for red tape, with which it is said to strangle the more advanced and ambitious schools in the interests of weaker country schools, that have to be kept up to the mark by strict regulations. However that may be, there is no advanced secondary education in the colony. The schools do not

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